
VERMONT LOCAL ROADS
The Webinar Will Begin Soon
Welcome!

Welcome to the Webinar

Thanks for joining us today. A quick moment for housekeeping…

- Everyone is currently muted.
- You can choose to have your camera on or off.

- You're welcome to use the chat box to post questions/comments. We have someone who will be monitoring it throughout the webinar.
- If you have any technical difficulties, let us know by emailing vermontlocalroads@vermont.gov or post a note in the chat box and we will help.
- This webinar is being recorded.
- At this time, please use the chat box to introduce yourself… tell us your name and what town or organization you're with and a list of other folks in the room attending with you.

Enjoy the Webinar!

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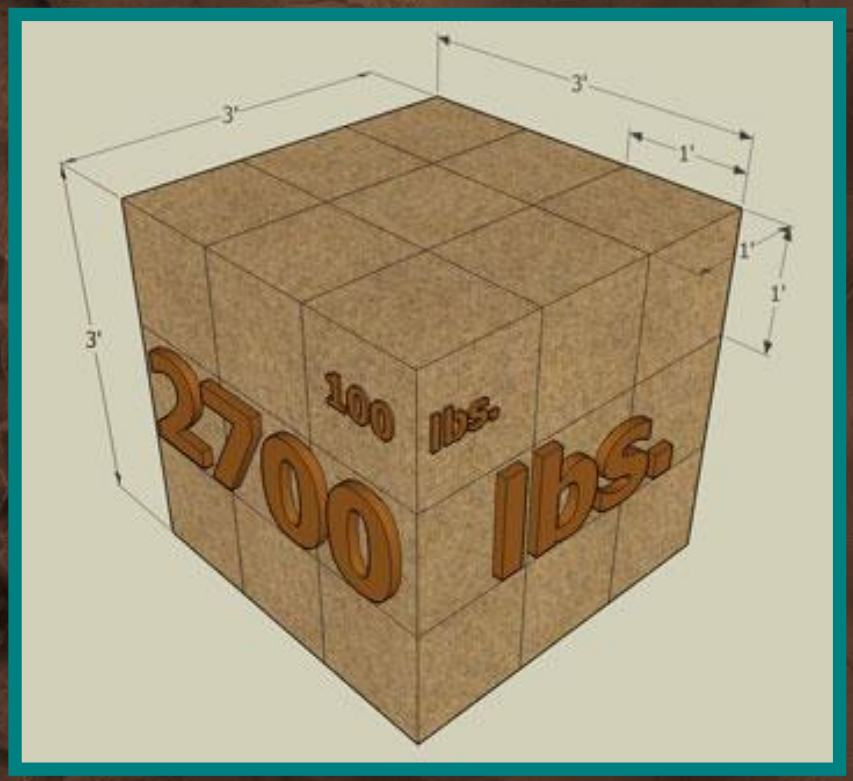
Trenching & Shoring

Presented by: Todd Eaton
VLR, Technical Training Specialist

VERMONT LOCAL ROADS

Soil is Heavy



Dangers

Excavation or Trench? What's the difference?

Overview of OSHA's rule

- 29 CFR 1926.650-.652
  - Assign a competent person
  - Keep spoil piles and heavy equipment away from the edge of trench
  - Use adequate protective systems
  - Train on hazard recognition and avoiding unsafe conditions

Notifying the Authorities

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RED	ELECTRIC
YELLOW	GAS, OIL, STEAM
ORANGE	COMMUNICATIONS
BLUE	POTABLE WATER
PURPLE	RECLAIMED WATER
GREEN	SEWER / DRAINAGE
PINK	SURVEY MARKS
WHITE	PROPOSED EXCAVATION

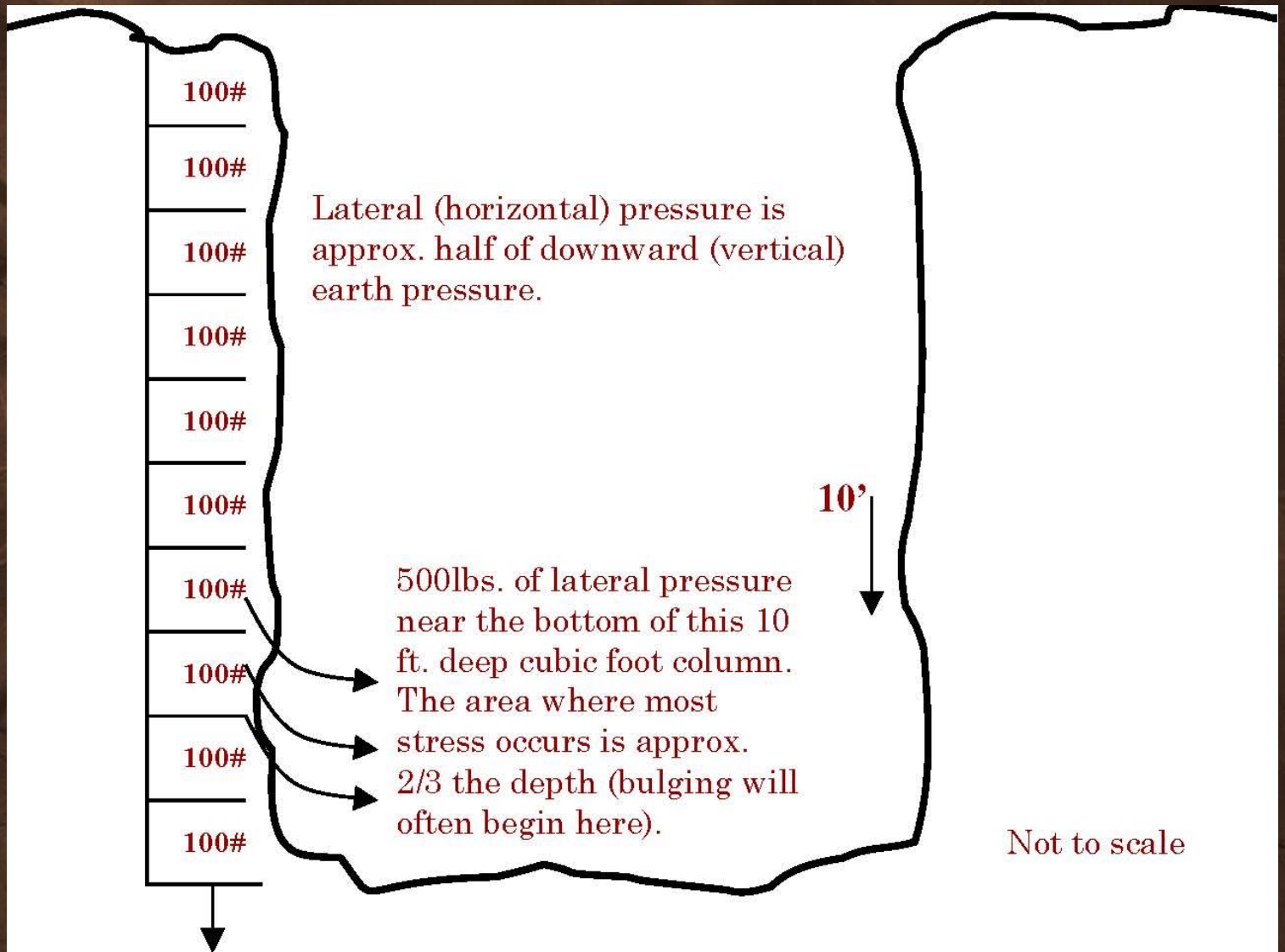
Competent Person


COMPETENT PERSONS MUST HAVE THE AUTHORITY TO TAKE PROMPT CORRECTIVE ACTION


THIS 6’ DEEP VERTICAL-SIDED TRENCH IS DANGEROUS BECAUSE IT IS NOT PROTECTED
HITACHI

What is a Cave-In?

Naturally Occurring Forces



How Deep is the Excavation?

Four-foot rule-

- OSHA requires means of egress at 4FT
- Means of egress within 25FT

How Deep is the Excavation?

Five-foot rule-

- OSHA requires protection from cave-ins by protective systems unless the excavation is: (1926.652(a))
  - Entirely in stable rock, or
  - Less than five feet and the competent person determines there's no risk of potent

Testing & Classifying the Soil

- If your trench is not in stable rock or is five-feet or more in depth, it must be protected
- The competent person is responsible for testing and classifying the soil.
- If in doubt, treat it as type C.

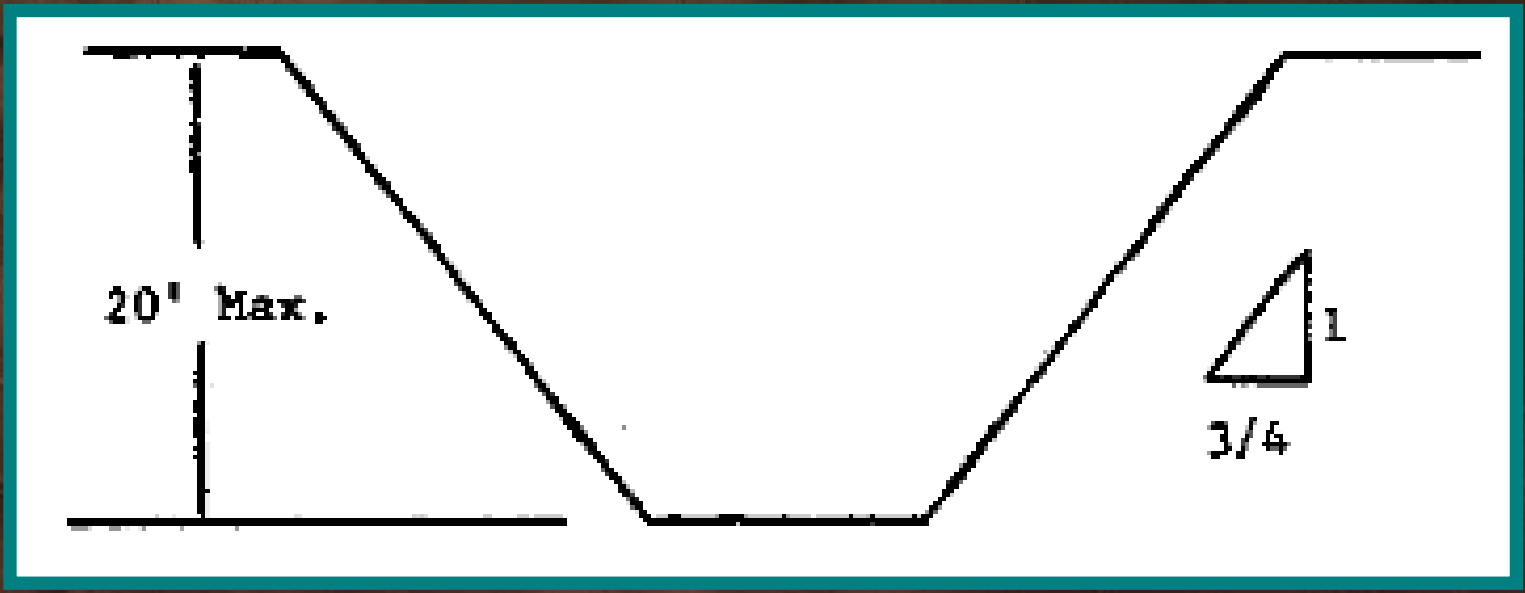
Stable Rock

- Natural solid mineral matter that can be excavated with vertical sides and remain intact while exposed.

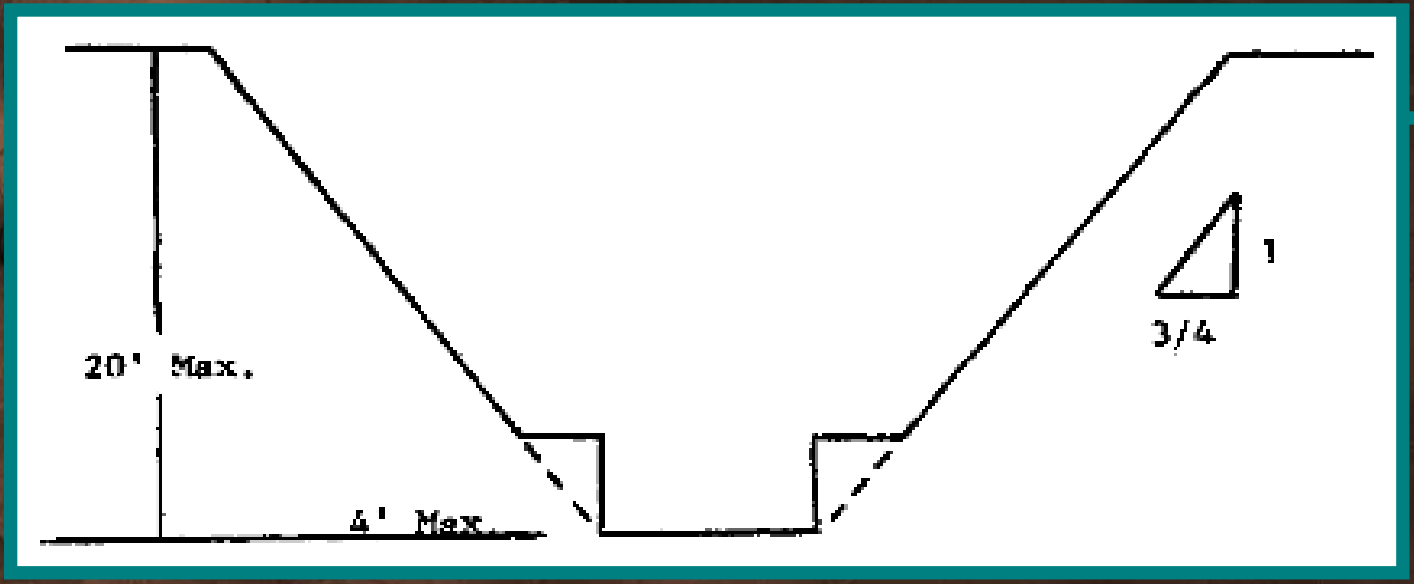
Type A Soil

- **TYPE A SOILS** are cohesive soils with an unconfined compressive strength of 1.5 tons per square foot (tsf) or greater.
- Cannot be fissured, subject to vibration of any type, previously disturbed, part of a sloped, layered system that dips into the excavation on a 4H:1V slope or greater, or has seeping water.

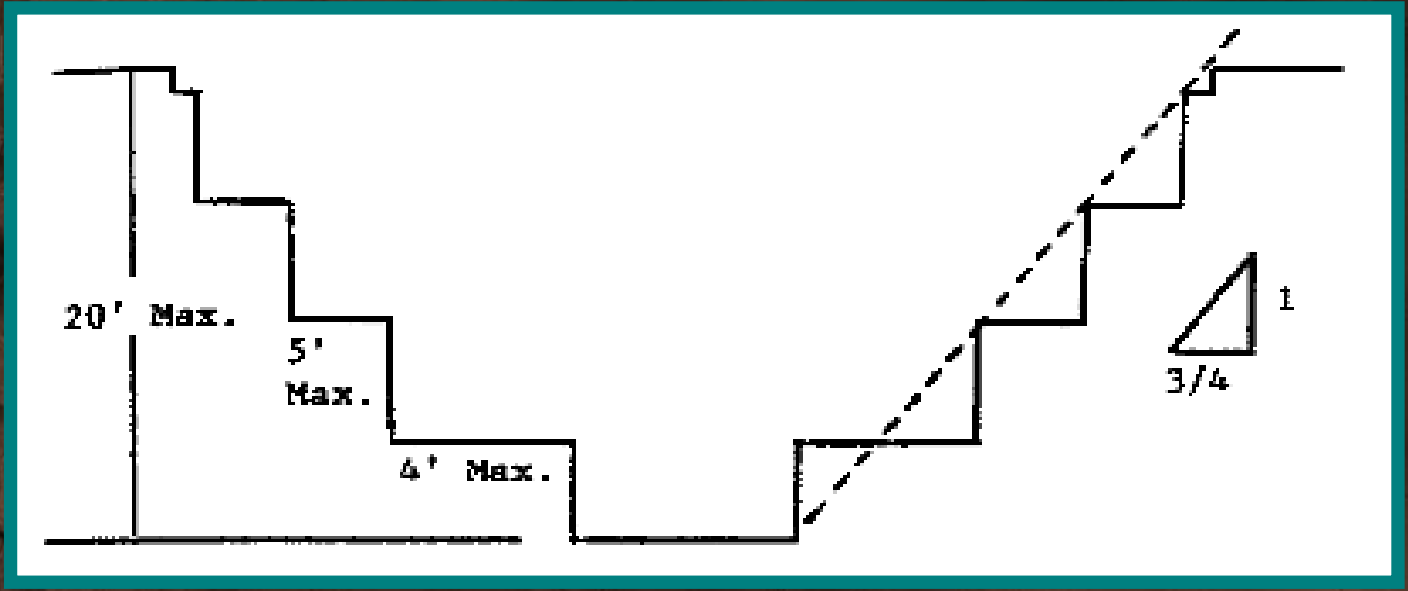
Type A Soil Slope – ¾:1



Type A Bench



Simple Bench

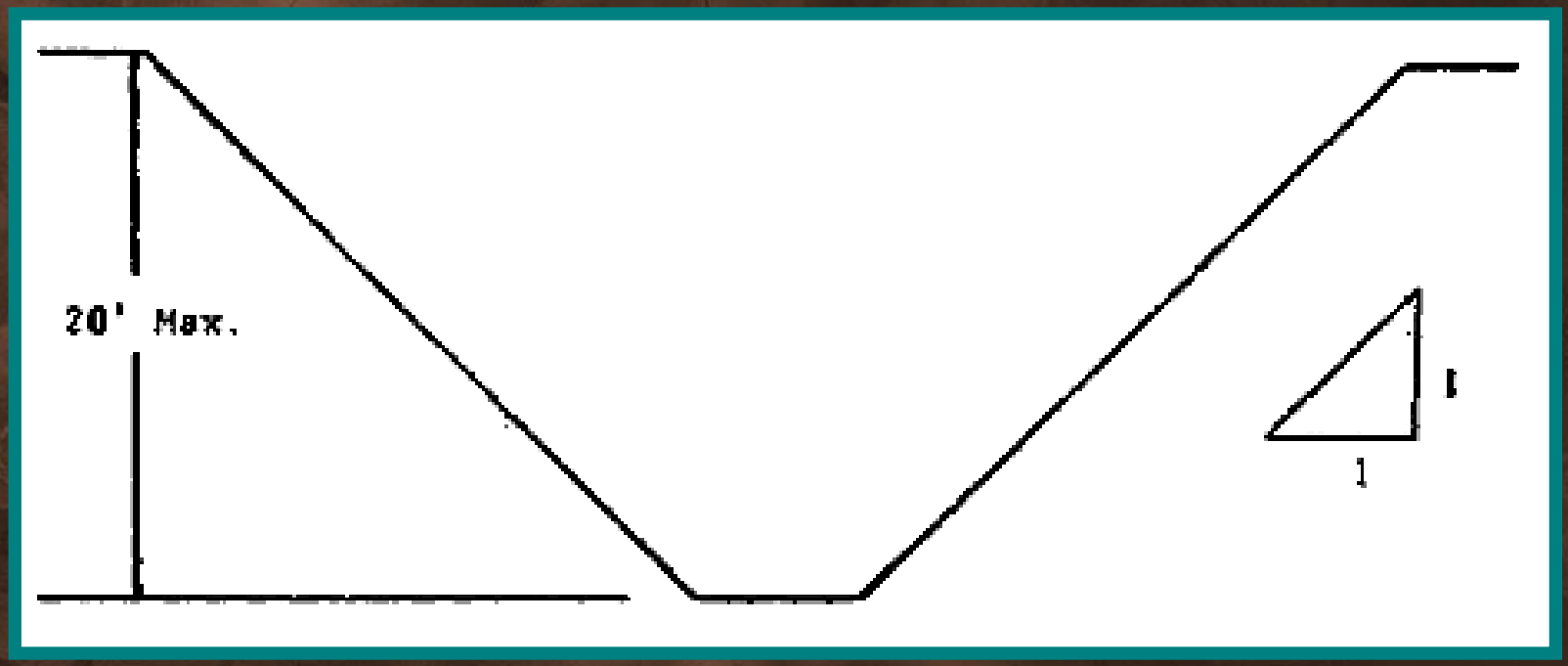


Multiple Bench

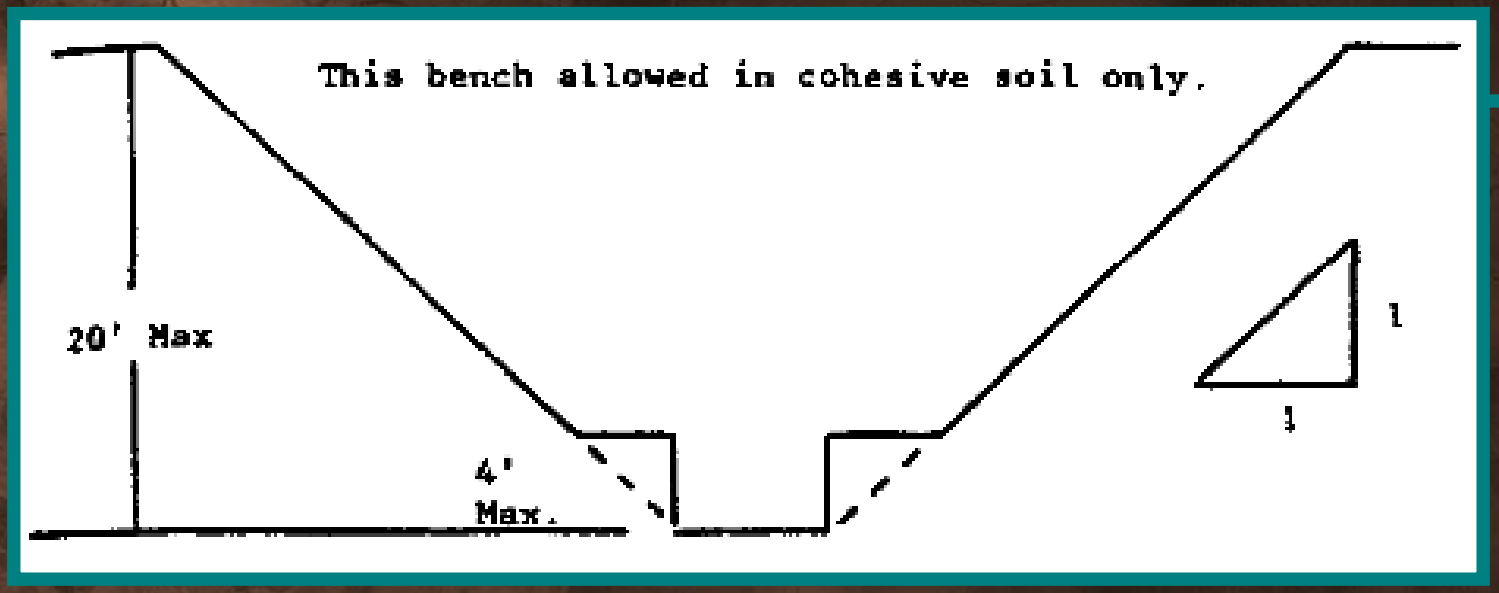
Type B Soil

- **TYPE B SOILS** are cohesive soils with an unconfined compressive strength greater than 0.5 tsf but less than 1.5 tsf.
- Soils that meet the unconfined compressive strength or cementation requirements of Type A soils but are fissured or subject to vibration; dry unstable rock; and layers sloping into the trench at less than 4H:1V.

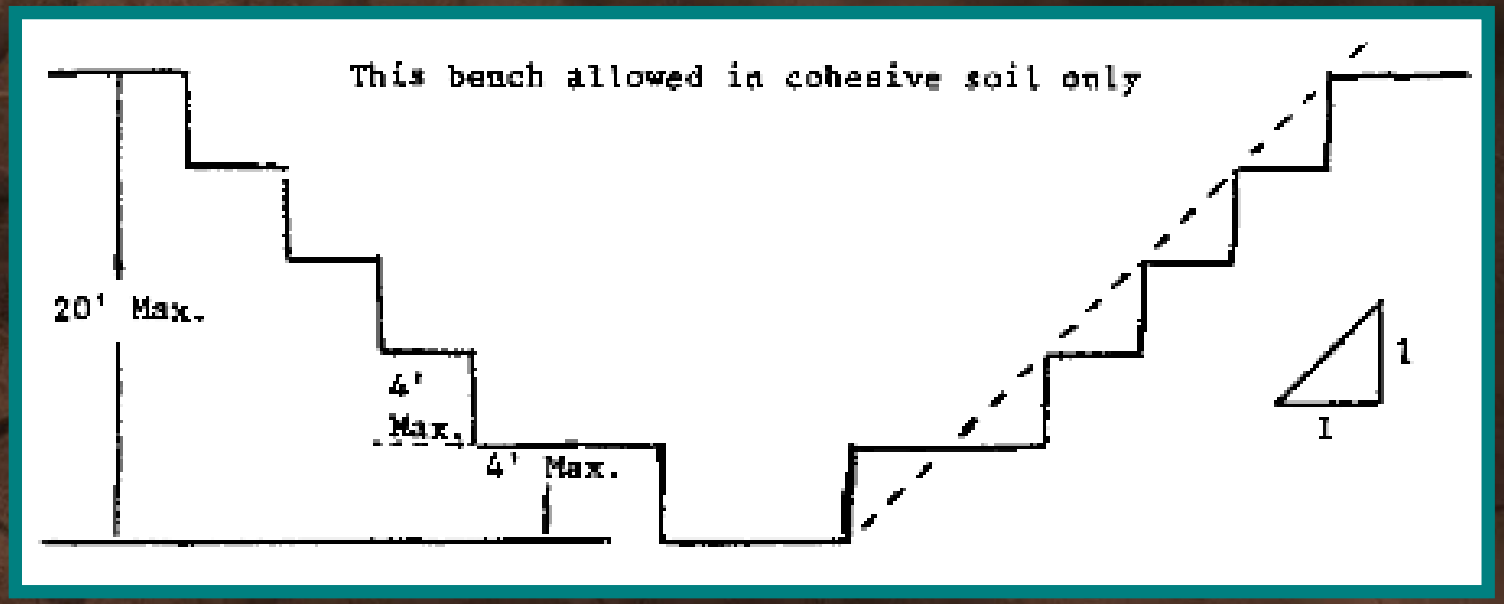
Type B Soil Slope – 1:1



Type B Bench



Simple Bench

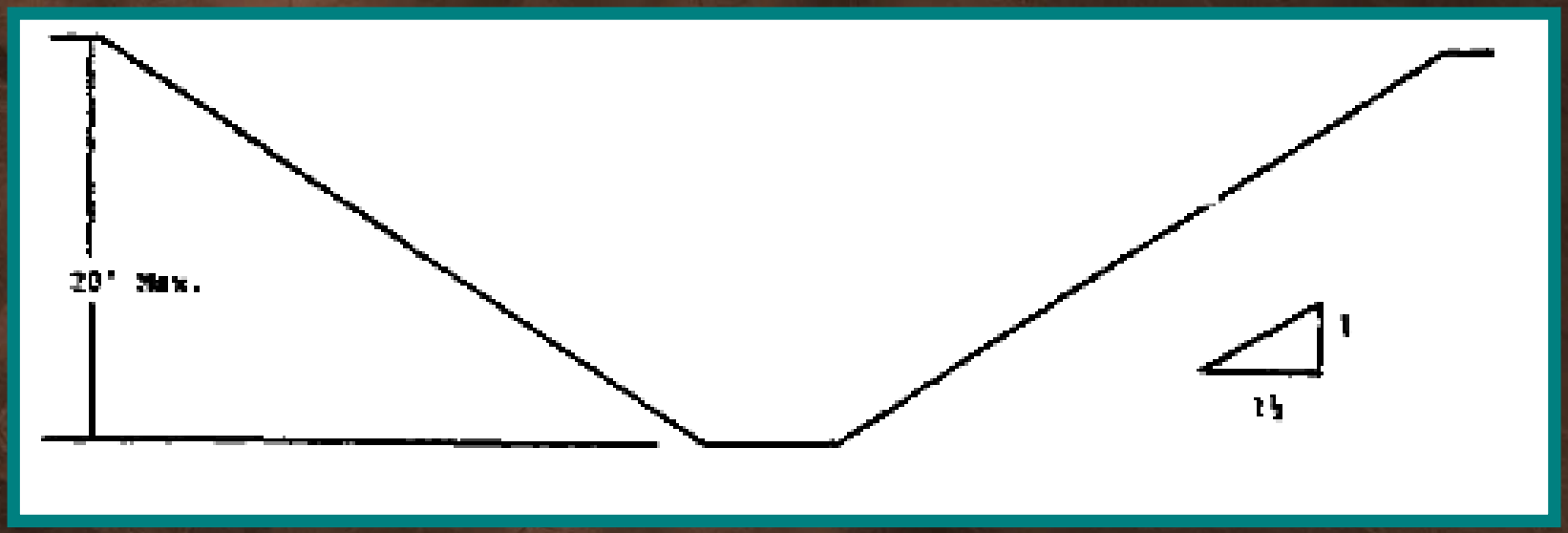


Multiple Bench

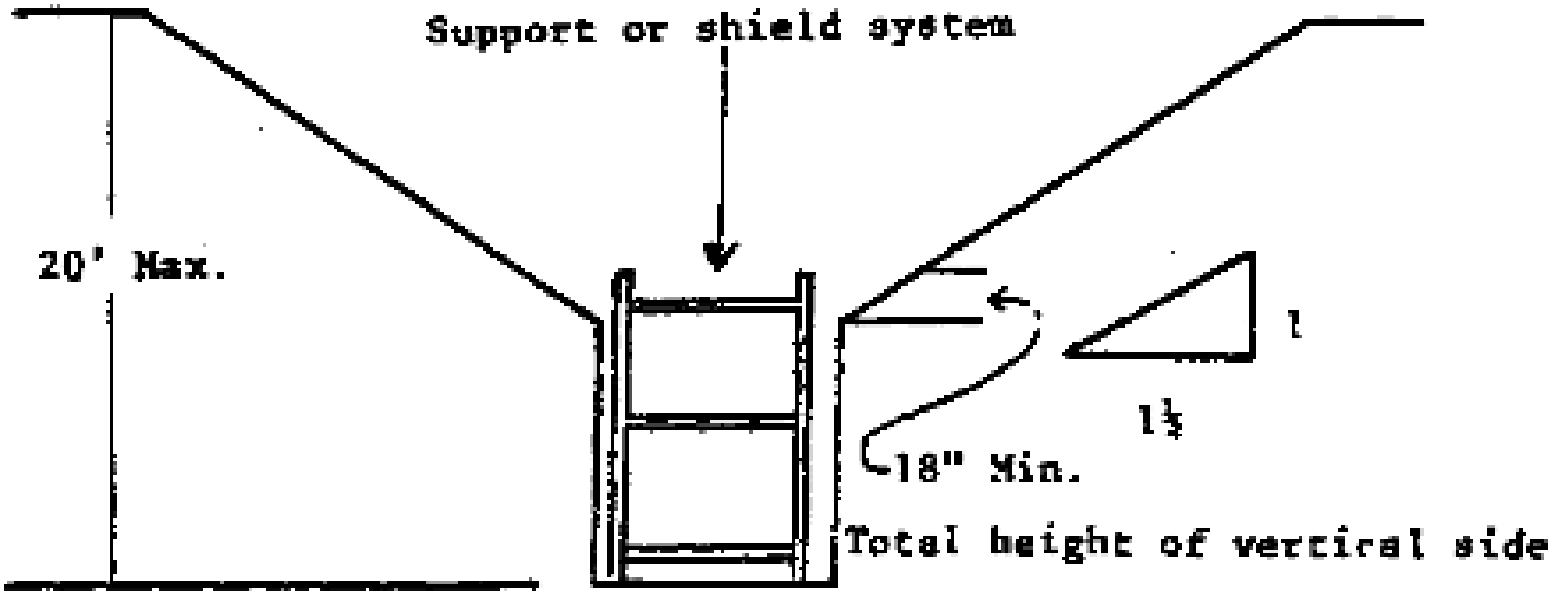
Type C Soil

- **TYPE C SOILS** are cohesive soils with an unconfined compressive strength of 0.5 tsf or less.
- Granular soils such as gravel, sand and loamy sand, submerged soil, soil from which water is freely seeping, and submerged rock that is not stable.

Type C Soil Slope – 1½:1

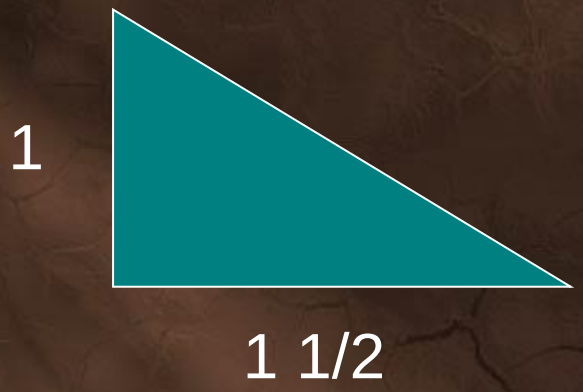


Type C Soil – Sloping & Shielding

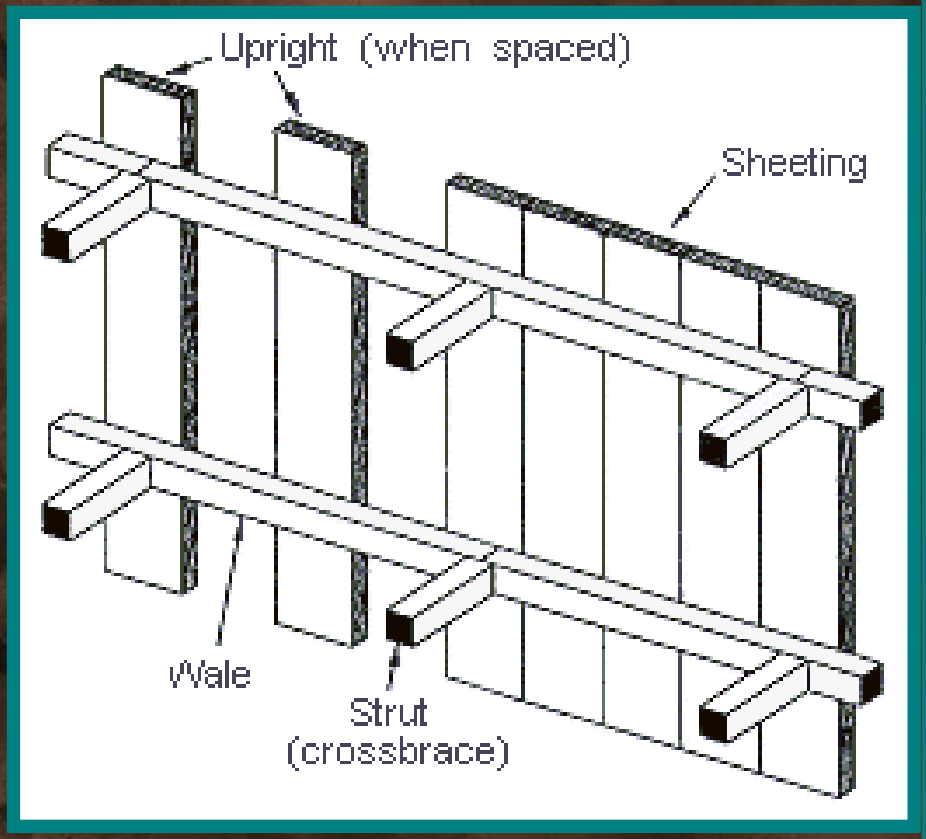


Why bother classifying?

- Classify soil to determine the type of protective system to be used.
- If not, then:
  - Excavations must be treated as type C and have a slope of 1 ½ horizontal to 1 vertical (34 degrees), be shielded, or shored.



Shoring Systems



Example of Trench Box

THIS INCOMPLETE INSTALLATION PROVIDES LITTLE IF ANY PROTECTION; IN FACT, THE PANELS THEMSELVES CAN BECOME A CRUSHING HAZARD


THESE WORKERS HAVE LEFT THE PROTECTION OF THEIR TRENCH BOX; A CAVE-IN COULD HAPPEN AT ANY MOMENT

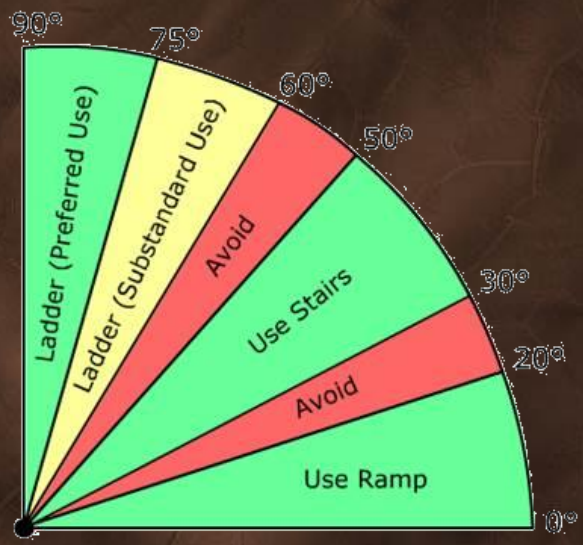
Personal Protective Equipment

- Hard hats are required for trench work because of overhead hazards, whether working alongside the trench or in the trench.
- Ventilation equipment may be required if there is a possibility of an atmospheric hazard.

Getting In & Out of the Trench

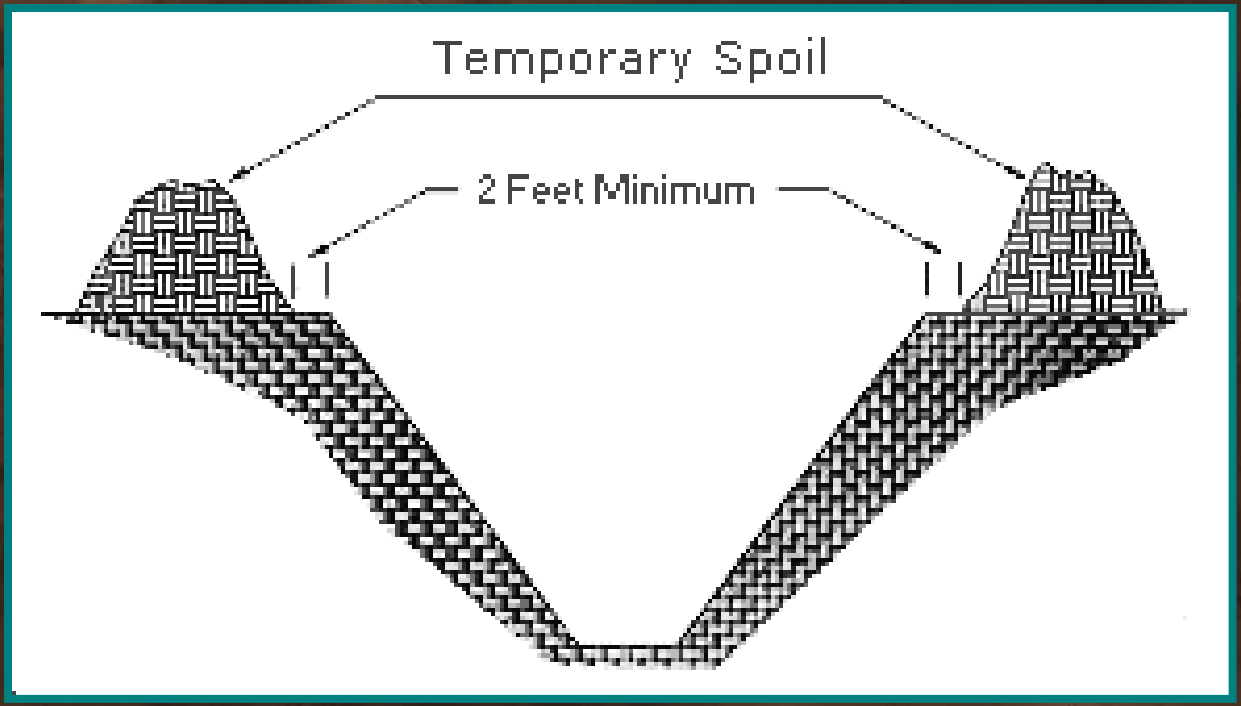
- Structural ramps
- Ladders
- Earthen ramps

Ramps, Ladders, and Stairs



Jobsite Hazards

- Vehicle exposure – wear warning/reflective vest
- Spoil pile – 2 feet away minimum
- Falling loads – do not work under equipment



Inspections

- Daily and before the start of work
- As work conditions change
- After every rainstorm
- When fissures, cracks, undercutting, water seepage, bulging at bottom, etc. occur
- When there is a change in the size, location or placement of the spoil pile
- When there is any indication of change or movement in adjacent structures

What's wrong with this trench?

What's wrong with this trench?

- No means of egress
- Spoil pile too close to edge
- Shoring not complete
- Missing backfill
- No edge stabilization
- No hard hats
- No air monitoring

Summary

- Cave-ins account for most fatalities
- Four-foot rule – must have means of egress within 25 feet of all workers in trench
- Five-foot rule – protection from cave-ins must be provided by using shoring, sloping or trench box
- Soil classifications – Solid rock, A, B, C
- Hazards